Discussion of PHENIX input to RHIC Spin Document Requested by TK

PHENIX Spin Working Group
(Presented by Dave Kawall)
January 7th, 2005

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Proposed Plots for RHIC Spin Document

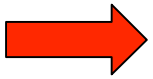
200 GeV

- Double Spin Asymmetry Measurements: A_LL
  - Pi0, direct photon, charged hadrons
  - Integrated Luminosities and beam pol. : from Wolfram

- Transverse Spin Asymmetry Measurements: A_N,A_T,A_TT
  - Pi0, charged pion production
  - Integrated luminosity : approx. 1/8 of total IL

500 GeV

- Double & Single Spin Asymmetries: A_LL, A_L,A_N/A_T
  - Delta G/G: Pi0, direct photon, charged hadrons, c & b physics with vertex detector
  - Delta Q/Q, Delta Qbar/Qbar



Should convert asymmetries into Delta G/G

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Luminosity Assumptions

(Started from Wolfram's L_max projections x 70% x 0.35 PHENIX eff.)

- 2006 - 2008 (200 GeV, 70% pol)
  - 10 weeks/yr : Transverse Spin : 10 inv. pb
  - 10 weeks/yr : Longitudinal Spin: 70 inv. pb
  - 5 weeks/yr : Transverse Spin : 2.5 inv. pb
  - 5 weeks/yr : Longitudinal Spin: 17.5 inv. pb

- 2009 - 2012 (500 GeV, 70% pol)
  - 10 weeks/yr : Transverse Spin : 27 inv. pb
  - 10 weeks/yr : Longitudinal Spin: 187 inv. pb
  - 5 weeks/yr : Transverse Spin : 7 inv. pb
  - 5 weeks/yr : Longitudinal Spin: 47 inv. pb

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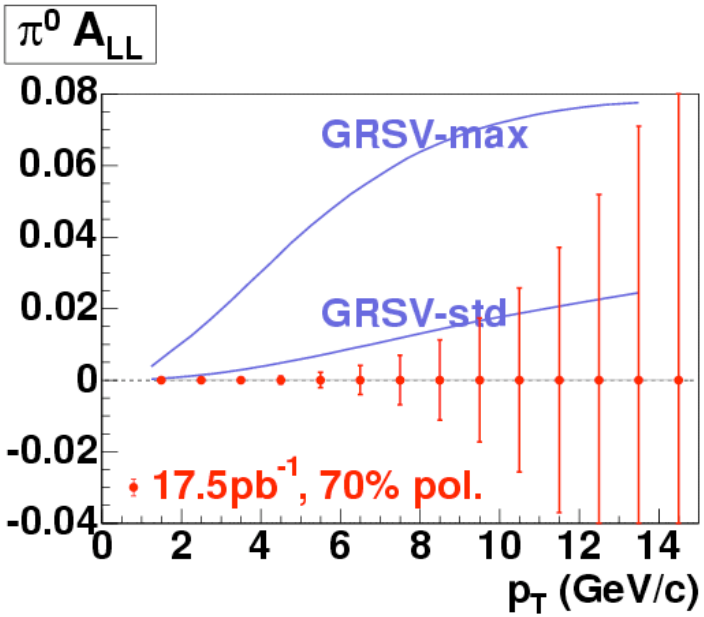
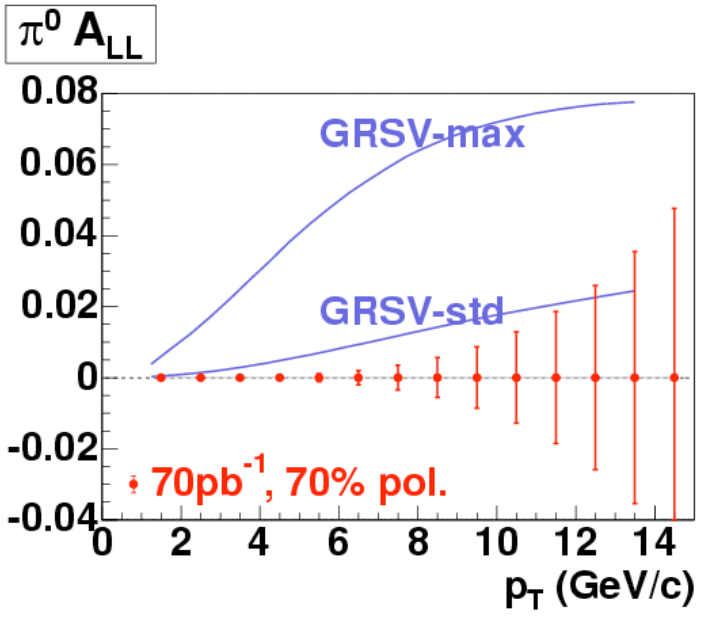
Double Spin Asymmetries



200 GeV, 5 wk/yr



200 GeV, 10 wk/yr

(thanks to Yoshi Fukao)

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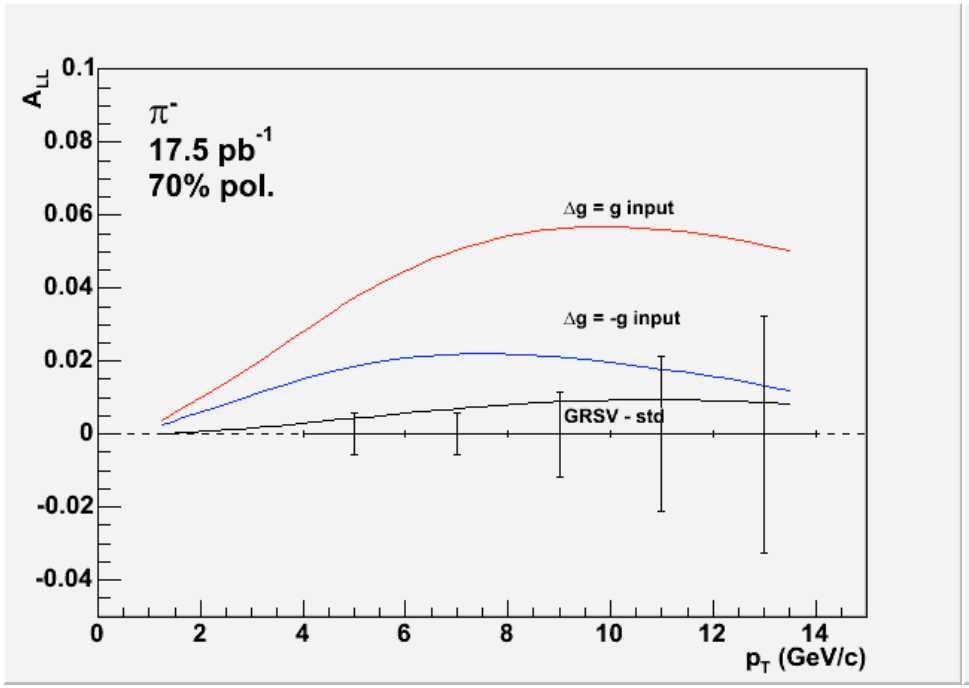
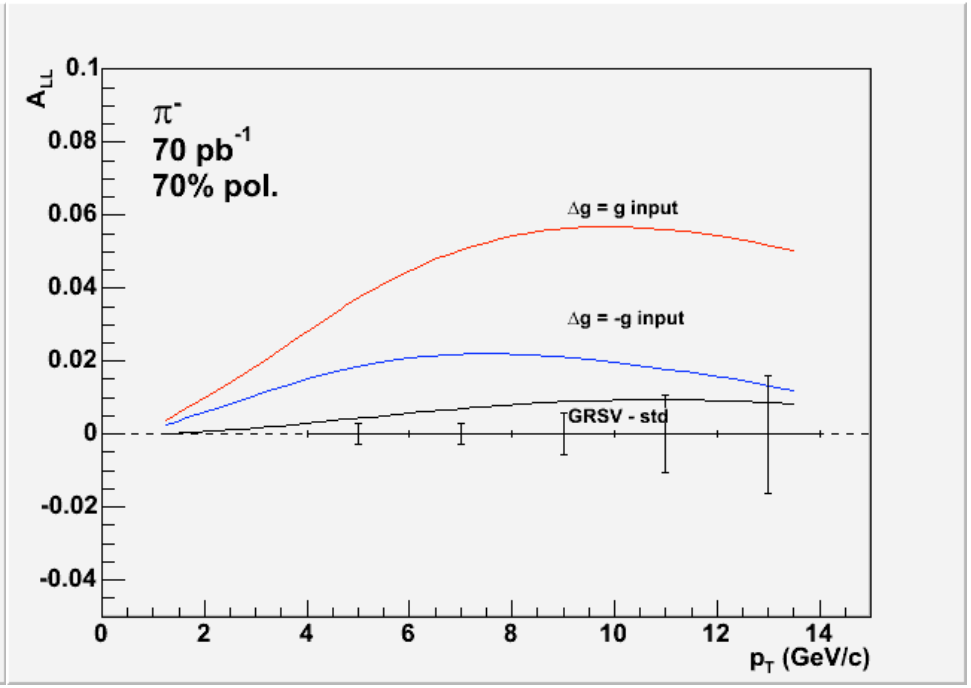
Double Spin Asymmetries



200 GeV, 5 wk/yr



200 GeV, 10 wk/yr

(thanks to Christine Aidala)

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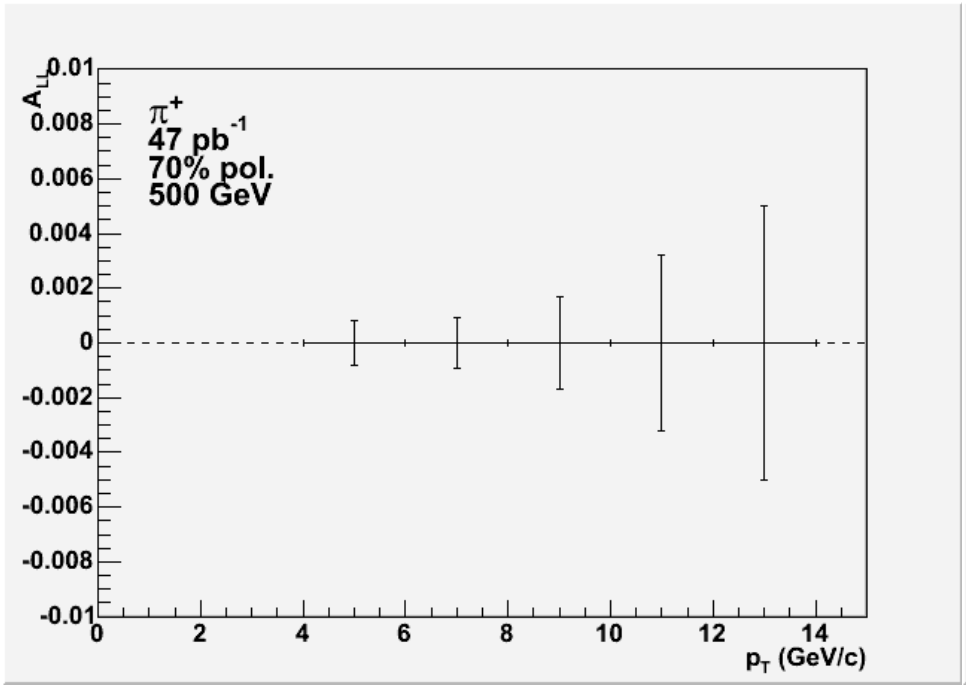
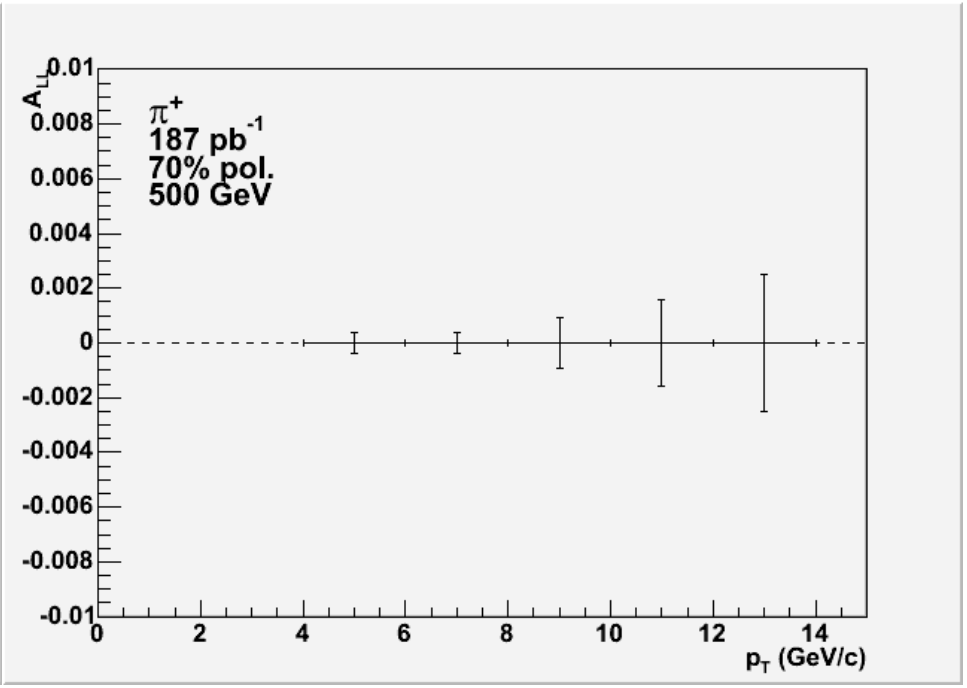
Double Spin Asymmetries



500 GeV, 5 wk/yr



500 GeV, 10 wk/yr

(thanks to Christine Aidala)

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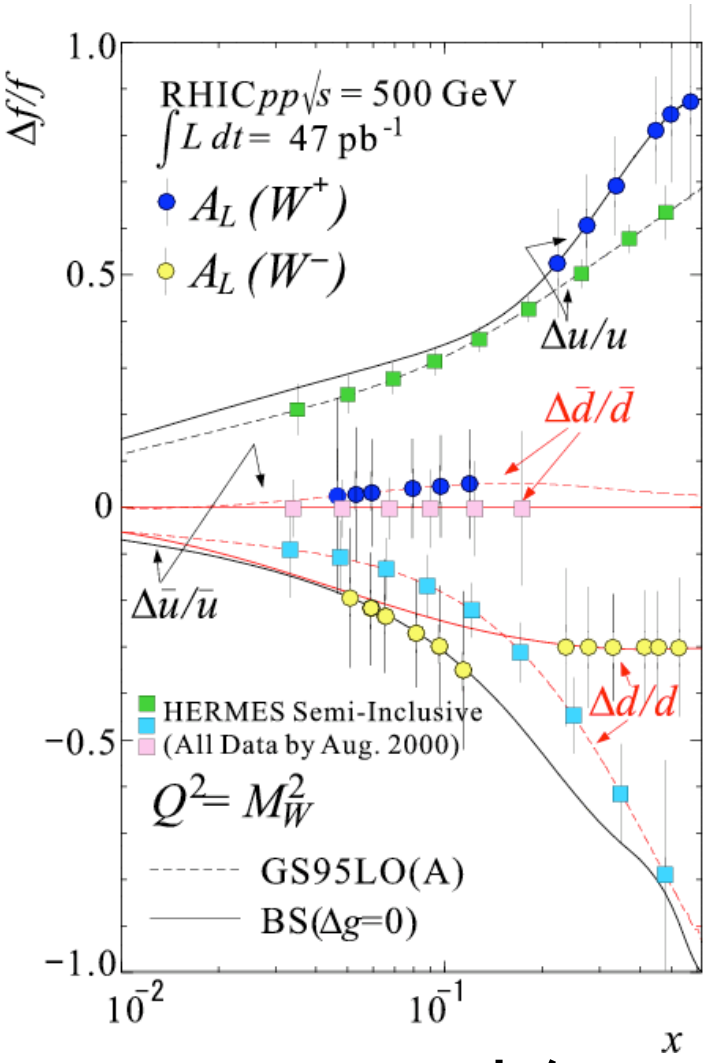
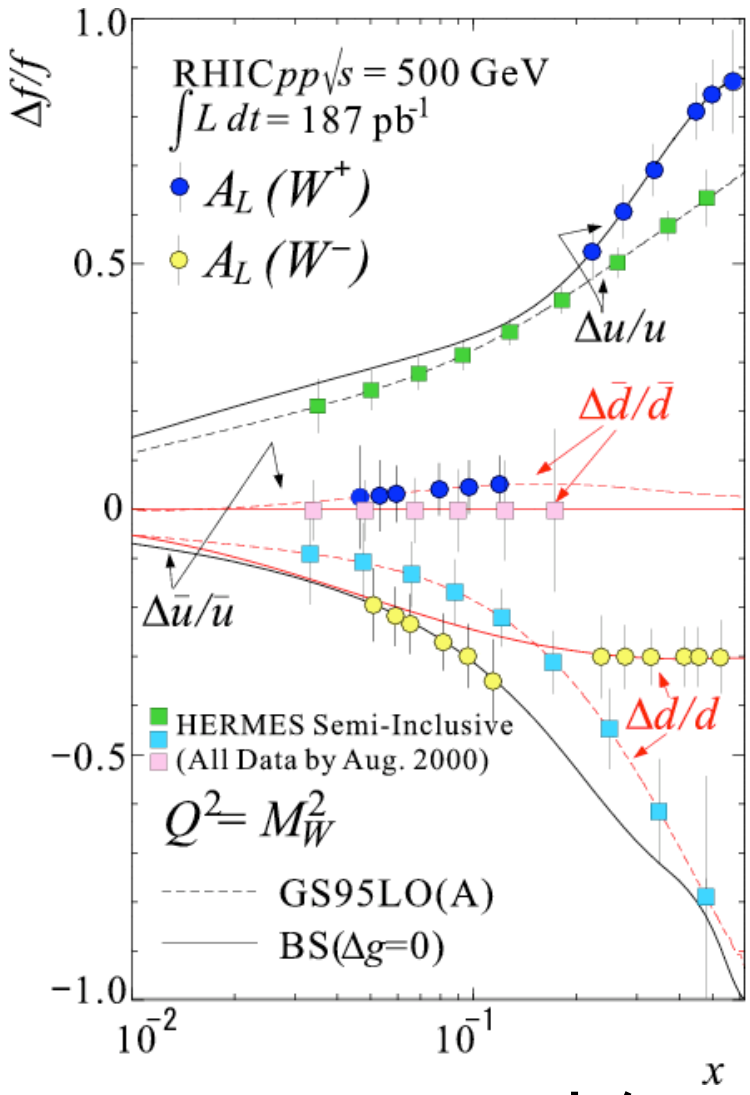
Single Spin Asymmetries



500 GeV, 5 wk/yr
(thanks to Naohito)



500 GeV, 10 wk/yr

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PHENIX Detector Plans

- Before 2010 is baseline, anything later is ``new"
- Additional equipment for vital spin physics at PHENIX
  - Additions to muon trigger : funded by non-DOE funds
  - Silicon is already in the plan based on HI interests
- If Constant Effort (CE)
  - Si Barrel through DOE + RIKEN funds (HI Baseline)
  - Muon trigger through non-DOE funds (Spin Baseline)
- If CE + 5%
  - Si Barrel through DOE + RIKEN funds
  - Muon trigger (NSF + Japanese funds)
  - Restore 10 weeks/year of spin running
- If CE + 10%
  - Si barrel through DOE + RIKEN funds
  - Muon trigger (NSF + Japanese funds)
  - Restore 10 weeks/year of spin running
  - Fund nosecone such that ONE side is ready before first W physics run

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